# Complete Summary

## GUIDELINE TITLE

Infection control. Prevention of healthcare-associated infection in primary and community care.

## BIBLIOGRAPHIC SOURCE(S)

National Collaborating Centre for Nursing and Supportive Care. Infection control. Prevention of healthcare-associated infections in primary and community care. London (UK): National Institute for Clinical Excellence (NICE); 2003 Jun. 257 p. [292 references]

## GUIDELINE STATUS

This is the current release of the guideline.

## ** REGULATORY ALERT **

## FDA WARNING/REGULATORY ALERT

**Note from the National Guideline Clearinghouse**: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- February 28, 2008, Heparin Sodium Injection: The U.S. Food and Drug Administration (FDA) informed the public that Baxter Healthcare Corporation has voluntarily recalled all of their multi-dose and single-use vials of heparin sodium for injection and their heparin lock flush solutions. Alternate heparin manufacturers are expected to be able to increase heparin production sufficiently to supply the U.S. market. There have been reports of serious adverse events including allergic or hypersensitivity-type reactions, with symptoms of oral swelling, nausea, vomiting, sweating, shortness of breath, and cases of severe hypotension.

## COMPLETE SUMMARY CONTENT

## SCOPE

### DISEASE/CONDITION(S)

Healthcare-associated infections

### GUIDELINE CATEGORY

Prevention

### CLINICAL SPECIALTY

Infectious Diseases
Preventive Medicine

### INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Dentists
Dietitians
Health Care Providers
Hospitals
Nurses
Occupational Therapists
Patients
Physical Therapists
Physician Assistants
Physicians
Podiatrists
Public Health Departments
Respiratory Care Practitioners

### GUIDELINE OBJECTIVE(S)

To make recommendations on both the standard principles for preventing healthcare-associated infections and measures for preventing infections associated with three specific areas of care: the use of long-term urinary catheters, enteral feeding systems, and central venous catheters

### TARGET POPULATION

Patients of all ages who are receiving healthcare interventions in a primary or community care setting

**Note**: Guidelines for enteral feeding apply to adults and children over 1 year old

## INTERVENTIONS AND PRACTICES CONSIDERED

### Standard Principles

### Hand Hygiene

1. Hand washing technique using decontamination agents, including liquid soaps and alcohol handrubs
2. Emollient hand cream to protect hands from the adverse effects of hand decontamination practice

### Use of Personal Protective Equipment

1. Gloves
2. Aprons and gowns
3. Facemasks and eye protection
4. Respiratory protection

### Use and Disposal of Sharps

1. Use of needle safety devices
2. Appropriate response to sharps injury

### Education

1. Education of patients, their carers, and healthcare personnel
2. Adequate supplies of liquid soap, alcohol rub, paper towels and sharps bins

### Care of Patients with Long-Term Urinary Catheters (LTC)

1. Education of patients, their carers, and healthcare personnel
2. Assessment of the need for catheterization
3. Selection of catheter type and system (e.g., intermittent vs. indwelling, catheter valve vs. drainage bag)
4. Catheter insertion techniques
    - Insertion of urinary catheters by healthcare personnel
    - Self-catheterisation
5. Catheter maintenance techniques

### Care During Enteral Feeding

1. Education of patients, their carers, and healthcare personnel
2. Techniques for preparation and storage of feeds
3. Techniques for administration of feeds
4. Care of insertion site and enteral feeding tube

### Care of Patients with Central Venous Catheters

1. Education of patients, their carers, and healthcare personnel
2. Techniques for general asepsis

3. Catheter site care, including use of sterile gauze and tape or sterile transparent semipermeable polyurethane dressings and use of appropriate antiseptic agents for catheter disinfection during dressing changes
4. Standard principles for catheter management
    - Decontamination of injection ports or catheter hubs with alcohol or chlorhexidine gluconate
    - Use of inline filters (not recommended)
    - Use of antibiotic lock solutions (not routinely recommended)
    - Systemic antibiotic prophylaxis (vancomycin) (not recommended)
    - Use of a dedicated catheter lumen for parenteral nutrition
    - Use of sterile 0.9 percent sodium chloride injection or heparin sodium solutions to flush and lock catheter lumens
    - Use of needleless infusion systems
    - Assessment of the optimal interval for the routine replacement of intravenous (IV) administration sets

### MAJOR OUTCOMES CONSIDERED

- Rate of hospital-acquired infection
- Patient morbidity and mortality
- Rate of sharps injuries
- Effectiveness, cost, and applicability of needlestick prevention devices
- Rate of exposure of healthcare practitioners to splashes of blood or other body fluids
- Rate of healthcare practitioner uniform contamination
- Glove leakage rate
- Skin damage associated with hand decontamination techniques
- Presence of microorganisms following hand decontamination
- Complication rate (especially infection rate) following long-term catheterisation
- Rate of catheter-related bloodstream infection
- Cost-effectiveness

## METHODOLOGY

### METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Searches were constructed for each set of guidelines using relevant Medical Subject Headings (MeSH) and free-text terms. On completion of the main search, an economic filter was applied. The following databases were searched:

- Medline
- Cumulated Index of Nursing and Allied Health Literature (CINAHL)
- Embase
- The Cochrane Library
- The National Electronic Library for Health

- The NHS Centre for Reviews and Dissemination (CRD) CRD includes 3 databases (Database of Abstracts of Reviews of Effectiveness (DARE), NHS Economic Evaluation Database (NHS EED), Health Technology Assessment (HTA) Database)
- Health CD Database
- Health Management Information Consortium Database
- The National Research Register
- The Web of Science
- The Institute of Health Technology
- Health Management Information Consortium Database (HMIC includes 3 databases: The Department of Health Library and Information Service (DHData), Health Management Information Service (HELMIS) from the Nuffield Institute and the Kings Fund Database)

The results of each search including abstracts were printed. The first sift of citations involved a review of the abstracts. Studies were retrieved if they were:

- Relevant to a review question
- Primary research/systematic review/meta-analysis
- Written in English

Where there was no abstract, the full article was retrieved.

No research designs were specifically excluded but wherever possible, in use rather than in vitro studies were retrieved.

The second sift involved a critical review of the full text, and articles relevant to a review question were critically appraised.

**NUMBER OF SOURCE DOCUMENTS**

Not stated

**METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

**RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

Evidence Categories

**Ia**: Evidence from meta-analysis of randomised controlled trials

**Ib**: Evidence from at least one randomised controlled trial

**IIa**: Evidence from at least one controlled study without randomisation

**IIb**: Evidence from at least one other type of quasi-experimental study

**III**: Evidence from non-experimental descriptive studies, such as comparative studies, correlation studies, and case-control studies

**IV**: Evidence from expert committee reports or opinions and/or clinical experience of respected authorities.

## METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

## DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

The Scottish Intercollegiate Guidelines Network (SIGN) data extraction form was used to document the results of critical appraisal (Available from the SIGN website http://www.sign.ac.uk). A form for descriptive studies was designed by the Guideline Development Group based on the SIGN methodology.

Evidence tables for accepted and rejected studies were generated and used to create evidence summary reports. The summary reports were, in turn, used as the basis for guideline writing.

## METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

## DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The evidence tables and reports were presented to the Guideline Development Group (GDG) for discussion. At this stage, expert advice derived from seminal works and appraised national and international guidelines were considered. Following extensive discussion the guidelines were drafted.

Factors influencing the guideline recommendations included:

- The nature of the evidence
- The applicability of the evidence
- Costs and knowledge of healthcare systems

Consensus within the GDG was mainly achieved though discussion facilitated by the group chair. Where necessary, agreement was arrived at by open voting.

## RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

### Recommendation Grades

**Grade A** - Directly based on category I evidence

**Grade B** - Directly based on category II evidence, or extrapolated recommendation from category I evidence

**Grade C** - Directly based on category III evidence, or extrapolated recommendation from category I or II evidence

**Grade D** - Directly based on category IV evidence, or extrapolated recommendation from category I, II or III evidence

## COST ANALYSIS

Although economic opinion was considered for each review question, the economic scope did not identify any high quality cost effectiveness evidence (e.g., economic evaluations alongside randomised controlled trials). As a result, simple decision analytic modelling was employed using estimates from published literature and expert opinion from the Guideline Development Group. Results were estimated initially for a "base case," (i.e., the most likely scenario). These results were then subjected to sensitivity analysis where key parameter values were varied. Areas were targeted where the impact on resource use was likely to be substantial. In addition, where there was no evidence of difference in clinical outcomes between interventions, simple cost analyses were performed to identify the potential resource consequences.

### Hand Hygiene

Economic analysis of cost effectiveness is based on the assumption that the rate of infection in primary and community care is 4 percent (i.e., half that in hospital), and that alcohol gel reduces infection rate by 30% or 25% (i.e., to 2.8% or 3.0%) compared to not washing. For every 1,000 patients, between 10 and 12 infections would be avoided. If each infection resulted in a nurse visit (estimated cost 25 pounds sterling) then between 250 and 300 pounds sterling would be saved in avoided costs. This is without the possibility of Accident and Emergency Department attendances and/or inpatient stays. Therefore, if the cost of an alcoholic handrub* is within 25 pence of the cost of conventional handwashing, it will be cost saving. If one were to include patient outcomes (i.e., of avoiding infection with the associated morbidity and mortality) and hospital attendance, the cost effectiveness of hand hygiene with alcohol rubs would increase.

The cost of a single hospital acquired infection is estimated to be over 3,000 pounds sterling. The author concludes that even a very low reduction in infections through the use of alcohol handrubs would be cost saving. It is felt that although the above analysis is in a different setting, it represents a conservative analysis.

### Use of Gloves

A cost comparison of the various gloves materials is presented in the full version of original guideline document. Healthcare personnel should be aware of the cost differential in gloves and should select the most appropriate for the activity.

### Needlestick Injury Prevention

A comprehensive report and product review conducted in the US provides background information and guidance on the need for and use of needlestick prevention devices in four clinical applications:

- Delivering intravenous (IV) medications
- Delivering intramuscular and subcutaneous medications
- Introducing IV catheters
- Collecting blood

The report identifies that none of the devices evaluated is without limitations in relation to cost, applicability, and effectiveness. Some of the devices available are more expensive, may not be compatible with existing equipment, and paradoxically, may be associated with an increase in bloodstream infection rates.

**Urinary Catheterisation**

Data "neither supports nor refutes the need to utilize sterile, as opposed to clean, intermittent catheterisation." Economic analysis suggests that clean intermittent catheterisation is unlikely to lead to additional infections and the additional cost of sterile catheterisation is unlikely to be justified.

The systematic review identified a study that showed if catheter blockage occurs within a shorter interval, catheters should be changed more frequently to avert a future clinical crisis. An economic analysis suggested that there may be a cost saving in changing a catheter at six weeks when there is an increased likelihood of blockage (>50%).

## METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

## DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The guidelines were subject to extensive external consultation with registered stakeholders (see National Institute for Health and Clinical Excellence [NICE] Web site for consultation process and stakeholders)

# RECOMMENDATIONS

## MAJOR RECOMMENDATIONS

Levels of evidence (I-IV) and grading of recommendations (A-D) are defined at the end of the Major Recommendations field. In addition, some recommendations are based directly on UK health and safety legislation and are designated H&S.

**Standard Principles**

The recommendations on standard principles provide guidance on infection control precautions that should be applied by all healthcare personnel, and other carers, to the care of patients in community and primary care settings.

The recommendations are divided into three broad recommendation headings:

- Hand hygiene
- The use of personal protective equipment
- The safe use and disposal of sharps
- Education of patients their carers and healthcare personnel

**Hand Hygiene**

**B** - Hands must be decontaminated immediately before each and every episode of direct patient contact or care and after any activity or contact that could potentially result in hands becoming contaminated.

**A** - Hands that are visibly soiled, or potentially grossly contaminated with dirt or organic material, must be washed with liquid soap and water.

**A** - Hands must be decontaminated, preferably with an alcohol-based hand rub unless hands are visibly soiled, between caring for different patients and between different care activities for the same patient.

**D** - Before regular hand decontamination begins, all wrist and ideally hand jewellery should be removed. Cuts and abrasions must be covered with waterproof dressings. Fingernails should be kept short, clean, and free from nail polish.

**D** - An effective handwashing technique involves three stages: preparation, washing and rinsing, and drying. Preparation requires wetting hands under tepid running water **before** applying liquid soap or an antimicrobial preparation. The handwash solution must come into contact with **all** of the surfaces of the hand. The hands must be **rubbed** together vigorously for a minimum of 10-15 seconds, paying particular attention to the tips of the fingers, the thumbs, and the areas between the fingers. Hands should be rinsed thoroughly before drying with good quality paper towels.

**D** - When decontaminating hands using an alcohol handrub, hands should be free from dirt and organic material. The handrub solution must come into contact with all surfaces of the hand. The hands must be **rubbed** together vigorously, paying particular attention to the tips of the fingers, the thumbs, and the areas between the fingers, until the solution has evaporated and the hands are dry.

**D** - An emollient hand cream should be applied regularly to protect skin from the drying effects of regular hand decontamination. If a particular soap, antimicrobial hand wash, or alcohol product causes skin irritation an occupational health team should be consulted.

**Use of Personal Protective Equipment**

**D, H&S** - Selection of protective equipment should be based on an assessment of the risk of transmission of microorganisms to the patient and the risk of contamination of the healthcare practitioner's clothing and skin by patients' blood, body fluids, secretions, or excretions.

**D, H&S** - Gloves must be worn for invasive procedures, contact with sterile sites and non-intact skin or mucous membranes, and all activities that have been assessed as carrying a risk of exposure to blood, body fluids, secretions, or excretions, or to sharp or contaminated instruments.

**D, H&S** - Gloves must be worn as single-use items. They must be put on immediately before an episode of patient contact or treatment and removed as soon as the activity is completed. Gloves must be changed between caring for different patients and between different care or treatment activities for the same patient.

**D, H&S** - Gloves must be disposed of as clinical waste and hands decontaminated after the gloves have been removed.

**H&S** - Gloves that are acceptable to healthcare personnel and that conform to European Community (CE) standards must be available.

**H&S** - Sensitivity to natural rubber latex in patients, carers, and healthcare personnel must be documented, and alternatives to natural rubber latex gloves must be available.

**D, H&S** - Neither powdered gloves nor polythene gloves should be used in healthcare activities.

**D, H&S** - Disposable plastic aprons should be worn when there is a risk that clothing may be exposed to blood, body fluids, secretions, or excretions, with the exception of sweat.

**D, H&S** - Full-body fluid-repellent gowns must be worn where there is a risk of extensive splashing of blood, body fluids, secretions, or excretions, with the exception of sweat, onto the skin or clothing of healthcare practitioners (for example when assisting with childbirth).

**D, H&S** - Plastic aprons should be worn as single-use items, for one procedure or episode of patient care, and then discarded and disposed of as clinical waste.

**D, H&S** - Face masks and eye protection must be worn where there is a risk of blood, body fluids, secretions, or excretions splashing into the face and eyes.

**D, H&S** - Respiratory protective equipment, for example a particulate filter mask, must be used when clinically indicated.

**Safe Use and Disposal of Sharps**

**D, H&S** - Sharps must not be passed directly from hand to hand, and handling should be kept to a minimum.

**D, H&S** - Needles must not be recapped, bent, broken, or disassembled before use or disposal.

**D, H&S** - Used sharps must be discarded into a sharps container (conforming to UN3291 and BS 7320 standards) at the point of use by the user. These must not be filled above the mark that indicates that they are full.

**D, H&S** - Containers in public areas must be located in a safe position and must not be placed on the floor. They must be disposed of by the licensed route in accordance with local policy.

**D, H&S** - Needle safety devices must be used where there are clear indications that they will provide safer systems of working for healthcare personnel.

**D** - Everyone involved in providing care in the community should be educated about standard principles and trained in hand decontamination, the use of protective clothing, and the safe disposal of sharps.

**D** - Adequate supplies of liquid soap, handrub, towels, and sharps containers should be made available wherever care is delivered.

**Care of Patients with Long-Term Urinary Catheters**

These guidelines apply to adults and children and should be used in conjunction with the guidance on standard principles (see above). These guidelines focus on preventing infection. However, because infection has a complex interrelationship with encrustation and blockage, these aspects of catheter management are also addressed.

The recommendations are divided into five distinct interventions:

- Education of patients, their carers, and healthcare personnel
- Assessing the need for catheterisation
- Selection of catheter drainage options
- Catheter insertion
- Catheter maintenance

**Education of Patients, Their Carers, and Healthcare Personnel**

**D** - Patients and carers should be educated about and trained in techniques of hand decontamination, insertion of intermittent catheters where applicable, and catheter management before discharge from hospital.

**D** - Community and primary healthcare personnel must be trained in catheter insertion, including suprapubic catheter replacement and catheter maintenance.

**D** - Follow-up training and ongoing support of patients and carers should be available for the duration of long-term catheterisation.

**Assessing the Need for Catheterisation**

**D** - Indwelling urinary catheters should be used only after alternative methods of management have been considered.

**D** - The patient's clinical need for catheterisation should be reviewed regularly and the urinary catheter removed as soon as possible.

**D** - Catheter insertion, changes, and care should be documented.

**Catheter Drainage Options**

**C** - Following assessment, the best approach to catheterisation that takes account of clinical need, anticipated duration of catheterisation, patient preference, and risk of infection should be selected.

**A** - Intermittent catheterisation should be used in preference to an indwelling catheter if it is clinically appropriate and a practical option for the patient.

**D** - For urethral and suprapubic catheters, the choice of catheter material and gauge will depend on an assessment of the patient's individual characteristics and predisposition to blockage.

**D** - In general, the catheter balloon should be inflated with 10 mL of sterile water in adults and 3-5 mL in children.

**A** - In patients for whom it is appropriate, a catheter valve may be used as an alternative to a drainage bag.

**Catheter Insertion**

**D** - All catheterisations carried out by healthcare personnel should be aseptic procedures. After training, healthcare personnel should be assessed for their competence to carry out these types of procedures.

**A** - Intermittent self-catheterisation is a clean procedure. A lubricant for single-patient use is required for nonlubricated catheters.

**D** - For urethral catheterisation, the meatus should be cleaned before insertion of the catheter, in accordance with local guidelines/policy.

**D** - An appropriate lubricant from a single-use container should be used during catheter insertion to minimise urethral trauma and infection.

**Catheter Maintenance**

**D** - Indwelling catheters should be connected to a sterile closed urinary drainage system or catheter valve.

**D** - Healthcare personnel should ensure that the connection between the catheter and the urinary drainage system is not broken except for good clinical reasons, (for example changing the bag in line with the manufacturer's recommendations).

**D** - Healthcare personnel must decontaminate their hands and wear a new pair of clean, non-sterile gloves before manipulating a patient's catheter, and must decontaminate their hands after removing gloves.

**A** - Carers and patients managing their own catheters must wash their hands before and after manipulation of the catheter, in accordance with the recommendations in the Standard Principles section.

**D** - Urine samples must be obtained from a sampling port using an aseptic technique.

**D** - Urinary drainage bags should be positioned below the level of the bladder and should not be in contact with the floor.

**D** - A link system should be used to facilitate overnight drainage, to keep the original system intact.

**D** - The urinary drainage bag should be emptied frequently enough to maintain urine flow and prevent reflux and should be changed when clinically indicated.

**A** - The meatus should be washed daily with soap and water.

**D** - Each patient should have an individual care regimen designed to minimise the problems of blockage and encrustation. The tendency for catheter blockage should be documented in each newly catheterised patient.

**A** - Bladder instillations or washouts must not be used to prevent catheter-associated infection.

**D** - Catheters should be changed only when clinically necessary or according to the manufacturer's current recommendations.

**B** - Antibiotic prophylaxis when changing catheters should only be used for patients with a history of catheter-associated urinary tract infection following catheter change or for patients who have a heart valve lesion, septal defect, patent ductus, or prosthetic valve.

**D** - Reusable intermittent catheters should be cleaned with water and stored dry in accordance with the manufacturer's instructions.

**Care During Enteral Feeding**

These guidelines apply to adults and children and should be used in conjunction with the guidance on Standard Principles.

The recommendations are divided into four distinct interventions:

- Education of patients, their carers, and healthcare personnel
- Preparation and storage of feeds
- Administration of feeds
- Care of insertion site and enteral feeding tube

**Education of Patients, Their Carers, and Healthcare Personnel**

**D** - Patients and carers should be educated about and trained in the techniques of hand decontamination, enteral feeding, and the management of the administration system before being discharged from hospital.

**D** - Community staff should be trained in enteral feeding and management of the administration system.

**D** - Follow-up training and ongoing support of patients and carers should be available for the duration of home enteral tube feeding.

**Preparation and Storage of Feeds**

**A** - Wherever possible pre-packaged, ready-to-use feeds should be used in preference to feeds requiring decanting, reconstitution, or dilution.

**B** - The system selected should require minimal handling to assemble and be compatible with the patient's enteral feeding tube.

**A** - Effective hand decontamination must be carried out before starting feed preparation.

**D** - When decanting, reconstituting, or diluting feeds, a clean working area should be prepared and equipment dedicated for enteral feed use only should be used.

**D** - Feeds should be mixed using cooled boiled water or freshly opened sterile water and a no-touch technique.

**D** - Feeds should be stored according to the manufacturer's instructions and, where applicable, food hygiene legislation.

**D** - Where ready-to-use feeds are not available, feeds may be prepared in advance, stored in a refrigerator, and used within 24 hours.

**Administration of Feeds**

**C** - Minimal handling and an aseptic no-touch technique should be used to connect the administration system to the enteral feeding tube.

**C** - Ready-to-use feeds may be given for a whole administration session, up to a maximum of 24 hours. Reconstituted feeds should be administered over a maximum 4-hour period.

**B** - Administration sets and feed containers are for single use and must be discarded after each feeding session.

**Care of Insertion Site and Enteral Feeding Tube**

**D** - The stoma should be washed daily with water and dried thoroughly.

**D** - To prevent blockage, the enteral feeding tube should be flushed with fresh tap water before and after feeding or administering medications. Enteral feeding tubes for patients who are immunosuppressed should be flushed with either cooled freshly boiled water or sterile water from a freshly opened container.

**Care of Patients with Central Venous Catheters**

These recommendations apply to the care in the community of all adults and children with central venous catheters (CVCs) that are being used for the administration of fluids, medications, blood components and/or total parenteral nutrition. They should be used in conjunction with the recommendations on Standard Principles.

These recommendations do not specifically address the more technical aspects of the care of patients receiving haemodialysis, who will generally have their CVCs managed in dialysis centres.

The recommendations are divided into four intervention categories:

- Education of patients, their carers, and healthcare personnel
- General asepsis
- Catheter site care
- Standard principles for catheter management

**Education of Patients, Their Carers, and Healthcare Personnel**

**D** - Before discharge from hospital, patients and their carers should be taught any techniques they may need to use to prevent infection and safely manage a central venous catheter.

**D** - Community healthcare personnel caring for a patient with a central venous catheter should be trained, and assessed as competent, in using and consistently adhering to the infection prevention practices described in this guideline.

**D** - Follow-up training and support should be available to patients with central venous catheters and their carers.

**General Asepsis**

**B** - An aseptic technique must be used for catheter site care and for accessing the system.

**A** - Before accessing or dressing central venous catheters, hands must be decontaminated either by washing with an antimicrobial liquid soap and water or by using an alcohol handrub.

**A** - Hands that are visibly soiled or contaminated with dirt or organic material must be washed with soap and water before using an alcohol handrub.

**D** - Following hand antisepsis, clean gloves and a no-touch technique or sterile gloves should be used when changing the insertion site dressing.

**Catheter Site Care**

**A** - Preferably, a sterile, transparent, semipermeable polyurethane dressing should be used to cover the catheter site.

**D** - If a patient has profuse perspiration or if the insertion site is bleeding or oozing, a sterile gauze dressing is preferable to a transparent, semi-permeable dressing.

**D** - Gauze dressings should be changed when they become damp, loosened, or soiled, and the need for a gauze dressing should be assessed daily. A gauze dressing should be replaced by a transparent dressing as soon as possible.

**A** - Transparent dressings should be changed every 7 days or sooner if they are no longer intact or moisture collects under the dressing.

**A** - Dressings used on tunnelled or implanted central venous catheter sites should be replaced every 7 days until the insertion site has healed, unless there is an indication to change them sooner.

**A** - An alcoholic chlorhexidine gluconate solution should be used to clean the catheter site during dressing changes, and allowed to air dry. An aqueous solution of chlorhexidine gluconate should be used if the manufacturer's recommendations prohibit the use of alcohol with the product.

**D** - Individual sachets of antiseptic solution or individual packages of antiseptic-impregnated swabs or wipes should be used to disinfect the dressing site.

**D** - Healthcare personnel should ensure that catheter-site care is compatible with catheter materials (tubing, hubs, injection ports, luer connectors and extensions) and carefully check compatibility with the manufacturer's recommendations.

**General Principles for Catheter Management**

**C** - The injection port or catheter hub should be decontaminated using either alcohol or an alcoholic solution of chlorhexidine gluconate before and after it has been used to access the system.

**D** - In-line filters should not be used routinely for infection prevention.

**A** - Antibiotic lock solutions should not be used routinely to prevent catheter-related bloodstream infections (CRBSI).

**A** - Systemic antimicrobial prophylaxis should not be used routinely to prevent catheter colonisation or CRBSI, either before insertion or during the use of a central venous catheter.

**D** - Preferably, a single lumen catheter should be used to administer parenteral nutrition. If a multilumen catheter is used, one port must be exclusively dedicated for total parenteral nutrition (TPN), and all lumens must be handled with the same meticulous attention to aseptic technique.

**D** - Preferably, a sterile 0.9 percent sodium chloride injection should be used to flush and lock catheter lumens.

**D** - When recommended by the manufacturer, implanted ports or opened-ended catheter lumens should be flushed and locked with heparin sodium flush solutions.

**D** - Systemic anticoagulants should not be used routinely to prevent CRBSI.

**D** - If needleless devices are used, the manufacturer's recommendations for changing the needleless components should be followed.

**D** - When needleless devices are used, healthcare personnel should ensure that all components of the system are compatible and secured, to minimise leaks and breaks in the system.

**D** - When needleless devices are used, the risk of contamination should be minimised by decontaminating the access port with either alcohol or an alcoholic solution of chlorhexidine gluconate before and after using it to access the system.

**A** - In general, administration sets in continuous use need not be replaced more frequently than at 72-hour intervals unless they become disconnected or a catheter-related infection is suspected or documented.

**D** - Administration sets for blood and blood components should be changed every 12 hours, or according to the manufacturer's recommendations.

**D** - Administration sets used for TPN infusions should generally be changed every 24 hours. If the solution contains only glucose and amino acids, administration sets in continuous use do not need to be replaced more frequently than every 72 hours.

**Definitions**

**Evidence Categories**

**Ia**: Evidence from meta-analysis of randomised controlled trials

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**IIa**: Evidence from at least one controlled study without randomisation

**IIb**: Evidence from at least one other type of quasi-experimental study

**III**: Evidence from non-experimental descriptive studies, such as comparative studies, correlation studies and case-control studies

**IV**: Evidence from expert committee reports or opinions and/or clinical experience of respected authorities.

**Recommendation Grades**

**Grade A** - Directly based on category I evidence

**Grade B** - Directly based on category II evidence, or extrapolated recommendation from category I evidence

**Grade C** - Directly based on category III evidence, or extrapolated recommendation from category I or II evidence

**Grade D** - Directly based on category IV evidence, or extrapolated recommendation from category I, II or III evidence

### CLINICAL ALGORITHM(S)

None provided

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations")

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

- Effective use of standardised infection prevention techniques results in significant reductions in the incidence of preventable hospital acquired infection leading to a reduction in patient morbidity and mortality
- The insertion of urinary catheters by healthcare personnel who are competent in the procedure will minimise trauma, discomfort, and the potential for catheter-associated infection
- Antibiotic prophylaxis to prevent bacteraemia in patients with a long-term indwelling catheter may prevent endocarditis in patients with heart valve lesion, septal defect, patent ductus, or prosthetic valve

### POTENTIAL HARMS

- Frequent handwashing with chlorhexidine and other hand preparation agents has been associated with the occurrence of dermatitis.
- The frequent use of hand preparation agents may alter normal hand flora which may result in increase carriage of pathogens responsible for healthcare associated infection.
- Silicone Foley catheters have a greater tendency to "cuff" on deflation than latex catheters, particularly when used suprapubically. Cuffing can cause distress and injury to patients when the catheter is removed.
- Alcohol and other organic solvents and oil-based ointments and creams may damage some types of polyurethane and silicon central venous catheter (CVC) tubing.

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

This guidance represents the view of the Institute, which was arrived at after careful consideration of the evidence available. Health professionals are expected to take it fully into account when exercising their clinical judgment. The guidance does not, however, override the individual responsibility of health professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

Local health communities should review their existing practice for the prevention of healthcare-associated infection in primary and community care against this guideline as they develop their Local Delivery Plans. The review should consider the resources required to implement the recommendations set out in Section 1 of the short version of original guideline document (and in the "Major Recommendations" section of this summary), the people and processes involved, and the timeline over which full implementation is envisaged. It is in the interests of patients that the implementation timeline is a rapid as possible.

Relevant local clinical guidelines, care pathways, and protocols should be reviewed in the light of this guidance and revised accordingly.

This guideline should be used in conjunction with relevant health and safety legislation.

### IMPLEMENTATION TOOLS

Audit Criteria/Indicators
Patient Resources
Quick Reference Guides/Physician Guides

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Staying Healthy

### IOM DOMAIN

Effectiveness
Patient-centeredness
Safety

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

National Collaborating Centre for Nursing and Supportive Care. Infection control. Prevention of healthcare-associated infections in primary and community care. London (UK): National Institute for Clinical Excellence (NICE); 2003 Jun. 257 p. [292 references]

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2003 Jun

### GUIDELINE DEVELOPER(S)

National Collaborating Centre for Nursing and Supportive Care - National Government Agency [Non-U.S.]

### GUIDELINE DEVELOPER COMMENT

Developed by Thames Valley University on behalf of the National Collaborating Centre for Nursing and Supportive Care.

### SOURCE(S) OF FUNDING

National Institute for Health and Clinical Excellence (NICE)

### GUIDELINE COMMITTEE

Guideline Development Group

### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

*Committee Members*: Dr Anne Mulhall, Independent Consultant, Chair, Guideline Development Group; Professor Robert Pratt, Professor of Nursing, Thames Valley University, Project Director, Guideline Development Group; Carol Pellowe, Principal Lecturer, Thames Valley University, Project Manager, Guideline Development Group; Peter Harper, Senior Lecturer (Research), Thames Valley University; Heather Loveday, Principal Lecturer (Research), Thames Valley University; Dr Nicky Robinson, Reader, Thames Valley University; Dr Godfrey Smith, Honorary Consultant Microbiologist, Royal Liverpool Hospital; Dr Sarah Chieveley Williams, Consultant Anaesthetist, University College Hospital NHS

Trust; Mr Joe Peters, Consultant Surgeon, Princess Alexandra Hospital, Harrow; Mr PJR Shah, Senior Lecturer in Urology and Consultant Urologist, University College Hospital NHS Trust, London; Professor David Silk, Consultant Physician, Central Middlesex Hospital; Dr Jim Newey, General Practitioner, Weaver Vale Practice, Runcorn; Jo Bray, Nutrition Nurse Specialist, Central Middlesex Hospital; Daphne Colpman, Continence Adviser, University College Hospital NHS Trust, London; Anne Carroll, Community Infection Control Nurse, South West Kent PCT; Nicola Pratelli, Community Infection Control Nurse, South West London Health Protection Unit; Ian McQuarrie, District Nurse Team Leader, Langthorne Health Centre, London; Mrs Carolyn Wheatley, Patient representative, Patients on Intravenous & Nasogastric Nutrition Therapy (PINNT); Gerry Richardson, Research Fellow (Health Economist), Centre for Health Economics, York; Lisa Cooper, Head of Dietetics, St Catherine's Hospital, Wirral; Elizabeth McInnes, Senior Research and Development Fellow, National Collaborating Centre for Nursing & Supportive Care

## FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

In accordance with guidance from the National Institute for Health and Clinical Excellence (NICE), all Guideline Development Group members' interests were recorded on a standard declaration form that covered consultancies, fee-paid work, share-holdings, fellowships, and support from the healthcare industry.

## GUIDELINE STATUS

This is the current release of the guideline.

## GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format [PDF] format from the National Institute for Health and Clinical Excellence (NICE) Web site.

## AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Infection control: prevention of healthcare-associated infections in primary and community care. NICE guideline. 2003 Jun. 47 p. Available in Portable Document Format [PDF] format from the National Institute for Health and Clinical Excellence (NICE) Web site.
- Infection control. Prevention of healthcare-associated infection in primary and community care. Supplementary information sheets. 2003 Jun. 8 p. Available in Portable Document Format [PDF] format from the NICE Web site.
- Pellowe CM, Pratt RJ, Harper P, Loveday HP, Robinson N, Jones SRLJ, MacRae ED and the Guideline Development Group: Mulhall A, Smith G, Bray J, Carroll A, Chieveley Williams S, Colpman D, Cooper L, McInnes E, McQuarrie I, Newey JA, Peters J, Pratelli N, Richardson G, Shah PJR, Silk J, Wheatley C. Evidence-based guidelines for preventing healthcare-associated infections in primary and community care in England. J Hosp Infect 2003; 55 Supp 2;S1-S127.

Additionally, Audit Criteria are included in Sections 2-5 of the original guideline document.

### PATIENT RESOURCES

The following is available:

- Prevention of healthcare-associated infections in primary and community care. Understanding NICE guidance - information for patients, their carers and the public. 2003 Jun. 25 p. Available in English and Welsh in Portable Document Format [PDF] format from the National Institute for Health and Clinical Excellence (NICE) Web site.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

### NGC STATUS

This NGC summary was completed by ECRI on January 6, 2005. The information was verified by the guideline developer on July 12, 2005. This summary was updated by ECRI Institute on June 22, 2007 following the U.S. Food and Drug Administration (FDA) advisory on heparin sodium injection. This summary was updated by ECRI Institute on March 13, 2008 following the updated FDA advisory on heparin sodium injection.

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